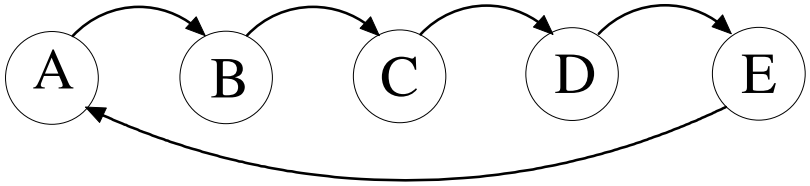
Lab 6 – Sequential Design II ELE202 FALL2007

Objectives
- Design a 3 flip-flop sequential circuit with random counting sequence
- Implement and demonstrate your design

Procedure
Your goal for this exercise is to design a simple state machine, actually a counter, using 3 flip flops (the building will be quite similar to lab 4). Each of you will be implementing a different state machine. In each case, your circuit should count repeatedly through a particular sequence of 5 distinct numbers: each number is between 0 and 7. Letting A, B, C, D, and E represent your five values, in order, the state diagram is:



We will build this circuit with three T flip-flops (derived from JK flip-flops). Determine your own unique sequence (see procedure below), work out the Boolean equations and implement the circuit. Connect the outputs of the flip-flops to the 4511 decoder to seven segment display (as done in lab 4). Use 555 to generate a slow clock (< 5Hz) so your sequence can be displayed on the seven segment display slow enough to make out.

Lab 6 – Sequence Assignments

Your sequence of 5 numbers is determined as follows:
1. Take the last five digits of your ID#.
2. If you have identical numbers; increase one of them by one. Repeat the process until no identical number.
3. If any one number is greater than 7 than take the modulo-8 (the remainder when divided by 8). If this leads to identical numbers, repeat step 2 and then this step.

Example:
- Last five digits of ID: 31359
- Increase the second “3” yields: 31459
- Replace 9 with modulo-8 of 9: 31451
- Increase the second 1: 31452

ELE202 Summary Report Form
Lab 6 – Sequential Design II

Lab day (circle one): Mon Tue Wed Thur

_____
NAME

Demonstrations:

Portion	Observed by	Date
Sequence seen:		

Show the process of how your three Boolean equations are derived:

How's your hardware usage:

	2-input	3-input
AND or NAND		
OR or NOR		

NOT	

Score: /10 pts.